Appln. S/N 10/809,421
Amdt. dated October 13, 2005
Reply to Office Action dated July 13, 2005

Remarks

Applicant requests that the application be amended as above described. The Abstract has been amended to comply with MPEP 608.01(b), and claims 1, 15 and 21 have been amended to clarify a feature of the invention. Claims 1-23 remain in this application.

In response to the Examiner's objection to the Abstract, the Abstract has been amended to delete the expression "is disclosed", and has replaced the term "having" with the term "has", as suggested by the Examiner.

The Examiner rejected claims 1-10, 14-17 and 21-23 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,108,227 (Voelkel). In response, Applicant has amended independent claims 1, 15 and 21 to recite features of the invention not taught or disclosed by Voelkel. More specifically, amended claims 1, 15 and 21 now recite that each second type of content addressable memory cell is smaller in size than each first type of content addressable memory cell. Therefore, the first and the second type of content addressable memory cells are now recited as being different in size from each other. Furthermore, several dependent claims have been amended to maintain proper antecedents for specific expressions and clarity of the recited invention. Claims 5 and 6 have been cancelled without prejudice.

Applicant submits that the aforementioned amendments do not add new subject matter.

Applicant directs the Examiner to paragraph [0011] of the description which discusses that a binary SCAM is smaller than a ternary SCAM cell due to the absence of specific transistors relative to the ternary SCAM cell. The advantages of using smaller CAM cells in an array are discussed in paragraph [0032] describing Figure 7: "*Therefore, CAM device memory array 100 maximizes silicon area efficiency because smaller sized binary CAM cells are used to store data that will only be binary in format. It is noted that binary CAM cells 90 can have a layout optimized to minimize column pitch. Hence silicon area along the row direction can be further conserved.*". Accordingly, the aforementioned amendment is consistent with an objective of the present invention, which is to provide a CAM device memory array that occupies minimal silicon area to maximize silicon area efficiency.

Applicant submits that Voelkel does not disclose or teach of a content addressable memory array having two different types of content addressable memory cells, where the two types of content addressable memory cells are sized differently from each

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other. In fact, Applicant submits that Voelkel teaches a content addressable memory array using exactly the same content addressable memory cell, which therefore do not differ in size from each other.

Figure 5 of Voelkel illustrates a row of configurable ternary content addressable memory cells, where cells 502-y to 502-(i+1) are set to operate in a ternary mode, while cells ·502-i to 502-0 are set to operate in a binary mode. Those of skill in the art will understand that Voelkel intends for cells 502-y to 502-0 to be the same configurable ternary content addressable memory cell. Column 10, lines 26-33 states *"It is understood that in the arrangement of FIG.5, multiple rows of novel ternary CAM cells can be commonly coupled to the mode lines ... Such an arrangement can allow for arbitrary column-wise selection of which cells will operate in a ternary mode, and which cells will operate in a binary mode..."*. Accordingly, such arbitrary selection of particular cells (by column) to operate either in a ternary or binary mode in the Voelkel teachings, is realized only if all the cells of the memory array are identical to each other.

Therefore, the content addressable memory array taught by Voelkel is <u>composed entirely of the same type of ternary content addressable memory cell</u>. Voelkel teaches that a specific number of configurable content addressable memory cells are set to operate in a binary mode while another specific number of configurable content addressable memory cells are set to operate in a ternary mode. While the functional operation of the binary mode and the ternary mode cells are different, both sets of content addressable memory cells are implemented with the same configurable ternary content addressable memory cell, and hence have the same size. Voelkel discloses only one ternary configurable content addressable memory cell in Figure 2, and nowhere does Voelkel teach the use of a different size of content addressable memory cells in the same memory array.

In the Office Action, the Examiner refers to column 4, lines 13-21 to illustrate the disclosure of conventional alternate embodiments of CAMs having binary and ternary portions. Applicant respectfully disagrees. The reference to the use of a binary and a ternary CAM is directed to an application where discrete binary and ternary CAM <u>chips</u> are integrated onto the same <u>circuit board</u>. In particular, Voelkel states with reference to the combination of binary and ternary CAMs: *"The first solution can be costly to implement and consume more space on a circuit board."*. Since packaged chips are connected to circuit boards (printed circuit boards), Voelkel discusses an embodiment where different chips are implemented on a

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circuit board. In contrast, the embodiments of the present invention are directed to integrating binary and ternary CAM cells within the same memory array.

Therefore, Applicant submits that Voelkel does not anticipate claims 1-10, 14-17 and 21-23 under 35 U.S.C. 102(b), since Voelkel does not disclose or teach a memory array having first and second types of content addressable memory cells having respective different sizes. Therefore, withdrawal of the Examiner's rejection thereto is respectfully requested.

The Examiner rejected claims 11-13 and 18-20 under 35 U.S.C. 103(a) as being obvious in view of Voelkel and U.S. Patent No. 6,191,970 (Pereira). In view the above amendments to claims 1 and 15, Applicant submits that claims 11-13 and 18-20 which depend either directly or indirectly from claims 1 and 15, are not obvious in view of Voelkel and Pereira. Withdrawal of the Examiner's rejection under 35 U.S.C. 103(a) is respectfully requested.

Therefore, Applicant submits that the application is now in condition for allowance, and favorable action to that end is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees, and credit any over payments to Deposit Account No. 501593, in the name of Borden Ladner Gervais LLP.

Respectfully submitted,

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By: _____

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